Three guys lost in the desert
EGM Interpretation in Complex Atrial Arrhythmia

EGM 2 Session
KHRS-2019, Seoul Korea
Chun Hwang, MD
Revere Health, Provo, UT, USA
Financial Disclosure

• Consultant for Boston Scientific
• Consultant Abbott medical
• Consultant for Johnson & Johnson
Case 1


- Pt persistent symptomatic bradycardia from sick sinus syndrome underwent DDD PM implant 6 months after after the ablation.

- Pt has been stable without anti-arrhythmic meds until 2 months ago when he noted sudden increase of HR above 100 bpm and continued to be high all the time.

- His symptoms at presentation were fatigue, minimal effort dyspnea and significant weight gain but no chest or syncope.
Baseline ECG
Catheter Positions
Baseline Intracardiac tachycardia
Induction: RA lateral wall pacing 500 ms - Tachycardia 1
Induction: RA lateral pacing 350 ms - Tachycardia 2
After Isuprel
Tachycardia 2: Isuprel wash out
Tachycardia 2 RA 3-D mapping and ablation
Entrainment CS pacing during tachycardia 1

CS 7-8 Pacing

CS 3-4 Pacing
Trans-septal and LA 3-D mapping with Orion Catheter
Ablation placed in LA appendage during Tachycardia 1
LA posterior roof mapping with Orion Ablation in LAA
LA anterior wall mapping with Ablation in LAA
LA roof mapping with Orion
Orion catheter mechanical trauma termination during roof mapping
Near termination site electrogram in sinus
Orion B 4-5 pacing from the termination site
3-D mapping during LA Appendage pacing at tachycardia rate
Ablation
Post ablation testing sinus rhythm on Isuprel
Summary

• Sick sinus
• Micro reentry or focal tachycardia from the anterior wall lateral to the anterior line gap with intermittent exit block (2:1, Mobitz I blocks)
• LA appendage by stander activation
• Unsuccessful Left lateral MV isthmus linear ablation with uni-directional block (LA appendage to lateral wall)
• LA Roof line and RA isthmus line block
• Complete PVI
Case 2

• Middle age female underwent lung transplant for progressive interstitial lung disease in 2008 has done well over the years but developed persistent refractory tachycardia with CHF symptoms
• Pt developed tachycardia induced CM associated LV systolic dysfunction over period of 9 months (LVEF 53% to 32%)
• Pt was referred for EP and ablation
Clinical tachycardia ECG
Clinical tachycardia EGM
HRA pacing
CS 5-6 pacing
CS pacing 1-2
3-D LA Mapping: RIPV ostium
Posterior wall double potentials
Posterior wall long fragmented potentials
3-D mapping: LA Mapping
Fusion during entrainment
Entrainment pacing: critical isthmus
Esophageal injury risk evaluation
Ablation EGM
Lung Transplant Surgery Techniques
Summary

• S/P double lung transplant pts tend to live longer than the single lung transplant.

• The median time develop atrial arrhythmia S/P lung transplant surgery is 6.9 yrs our series of 6pts.

• Most of them (5/6) developed left atrial flutter with the critical isthmus located posterior wall between the bilateral PV surgical anastomoses. One pt had posterior atrial cup anastomosis and LA flutter was MV annulus reentry with critical isthmus left lateral ridge.

• The mapping and ablation is relatively simple and highly successful and often require only few ablations to eliminate tachycardia.

• However, due to the posterior location, esophageal injury risk should be evaluated before the ablation.
Case 3

- 72 yrs old male pt with persistent left superior vena cava associated persistent atrial fibrillation and flutter underwent EP and ablation 2005. Ablation included PVI, PLSVC disconnection from LA lateral to postero-lateral and RA flutter.
- Pt has HTN, DM and obesity that have not been well controlled.
- Pt developed sick sinus and AV node conduction disease that required PM implant.
- Pt presented ER with palpitations due to the tachycardia induced upper pace-maker rate of 130 bpm.
- Pt was referred for evaluation.
Clinical tachycardia
Clinical Tachycardia EGM
RA distal pacing
RA posterior wall pacing
RA anterior septum pacing with His bundle catheter
RA Mid septal pacing
CS pacing
3-D RA mapping (Carto Penta Ray)
LA roof pacing
LA appendage pacing
3-D LA mapping
LA low posterior septum pacing
3-D Bi-atrial activation map
Ablation EGM
Termination
Summary

• S/P atrial fib ablation developed septal reentry with critical isthmus at the roof of PLSVC and LA low posterior septum junction
• This area is high risk for heart block but pt already had OM implant for AV node conduction disease.
• 3-D mapping confirmed PVI and previous PLSVC- LA disconnections.
• RA flutter linear ablation without reconnections.
• Ablations were completed from LA posterior septum to MV annulus
Revelation through the pioneer’s school by Hwang
Thank you for your attention